

Revision of the Araneae of New Zealand

Part I.

By G. CHAMBERLAIN.

Since the first publication on this interesting but much neglected order, Eleazar Albin's *Natural History of Spiders and Other Curious Insects* (1736), there have been about 50,000 species of Araneae described in several thousand papers. It is thus not surprising that Arachnologists seem to feel that the time has come for the existing knowledge of the order to be brought together for scrutiny and revision. Some 350 species of New Zealand spiders have been described from 1837 to the present day. A survey of these species will show that, in the light of modern knowledge, a large number of them must be regarded as synonyms; the types of nearly half cannot be found, and several of the types in existence are in poor condition. The spiders of New Zealand have not been widely collected and no doubt the list of species will be almost doubled before a satisfactory position is reached. For reasons such as those mentioned and in order to make possible the simple identification of New Zealand spiders, the author has commenced this revision.

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HISTORICAL REVIEW.

In 1827 the French corvette "Astrolabe" called at all our outlying islands and remained for some time in Queen Charlotte Sound. The naturalists on board the "Astrolabe," M.M. Quoy and Gaimard, who were ardent collectors, captured several spiders which, in 1837, were named as 10 separate species by Walckenaer in his *Histoire Naturelle des Insectes Apteres*. The types are not known and the descriptions given were not sufficiently detailed to enable future workers to identify their specimens. However, a few species are still associated with the name of Walckenaer. *Araneus crassus* Walckenaer is thus the oldest name applied to a New Zealand spider.

The expedition of H.M.S. "Erebus" and "Terror," under the command of Sir James Ross, in 1841 visited Campbell Island, the Auckland Islands, and the Bay of Islands. Several specimens of spiders were collected from which Adam White in 1849 described eight new species. The types of most of these are preserved in the British Museum, but are in such poor condition as to be unrecognisable.

In 1871 Dr. Ausserer described *Hexathele hochstetteri* from New Zealand. Lucas, Karsch and Hector each described a new species and in 1871 there appeared the first part of "*Die Arachniden Australiens*," a very comprehensive work on the spiders of Australasia, in which L. Koch added 35 species to the New Zealand fauna. The Rev. O. P. Cambridge, 1879, described 15 species in *Proceedings of the Zoological Society, London*, and in later publications described other species from New Zealand. M. Eugene Simon also contributed a few species to our rapidly increasing list.

Up to this time the arachnologists had been located in Europe, but from 1873 we find that the spiders of New Zealand are the subject of numerous papers in the *Transactions of the New Zealand Institute*, by L. Powell in 1873, P. Goyen 1886, and A. T. Urquhart, who from 1884 to 1893 named and described nearly 200 species.

Later, from 1901 to 1911, H. R. Hogg added 26 species and partially revised some of the earlier established genera. During 1912-1915 the Comte de Dalmas visited New Zealand and his interest was attracted to our spiders. He collected numerous specimens and on his return to France made a study of the Araneae, which resulted in the publication in 1917 of *Araignees de Nouvelle-Zelande*. This revision of the New Zealand spiders reduces the named species considerably, but his reasoning should be accepted with reserve, possibly due to the small amount of material available.

Finally, in 1933-35 Miss Elizabeth B. Bryant examined some of the types of Urquhart's species and redescribed them in modern genera. She also described 11 new species, the results being published in three papers in *Records of Canterbury Museum*. L. Berland, J. B. Gatenby and other workers have also contributed to the knowledge of New Zealand spiders.

CLASSIFICATION.

Throughout this revision the system of Professor Alexander Petrunkevitch is used (An Inquiry into the Natural Classification of Spiders, *Trans. Conn. Acad. Arts and Science*, 31, pp. 299-389, 1933).

Briefly, the Araneae are Arachnida in which the cephalic and thoracic somites are permanently fused, while the abdomen either remains segmented or more commonly loses its external segmentation during embryological development. The abdomen is joined to the cephalothorax by a thin pedicle (first abdominal somite) and bears spinnerets (modified pleiopods) on the fourth and fifth somites.

The orders Kustarachnae, Pedipalpi, Araneae, Palpigradi and Anthracomarti form the Super-Order Caulogastra of the Arachnid Sub-class Epectinata. The order Araneae is divided into five Sub-Orders. The key which follows will serve to distinguish these Sub-Orders.

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|--|-------------------------------|---|
| 1. Abdomen segmented in adult | 1. Sub-Order LIPHISTIOMORPHAE | |
| Abdomen not segmented in adult | | 2 |
| 2. Abdomen with two pairs book-lungs | | 3 |
| Abdomen with one pair book-lungs or none | | 4 |

3. Chelicerae paraxial 2. Sub-Order MYGALOMORPHAE
 Chelicerae diaxial 3. Sub-Order HYPOCHILOMORPHAE
 4. Abdomen with one pair book-lungs
 4. Sub-Order DIPNEUMONOMORPHAE
 Abdomen with no book-lungs .. 5. Sub-Order APNEUMONOMORPHAE

1. Sub-Order Liphistiomorphae.

The Liphistiomorphae include but nine species, of which several are extinct. The surviving species are limited to a relatively small area in Eastern Asia. No specimens of this Sub-Order have been found in New Zealand.

2. Sub-Order Mygalomorphae.

Only three of the eight families of Mygalomorphae occur in New Zealand, the Ctenizidae, Dipluridae and the Migidae, the latter being represented by a single genus, and the other families by two genera each.

**Key to Families and Sub-families Occurring in New Zealand,
 and List of Species.**

Branch OCTOSTIATAE.

(Spiders with four pairs of cardiac ostia.)

- I. Chelicerae with a rastellum Fam. Ctenizidae
 Sub-Fam. Ctenizinae
 Arbanitis gillicsii (Cambridge)
 Arbanitis huttoni Cambridge
 Cantuaria dendyi Hogg
 Chelicerae without a rastellum II.
- II. Lip free. Four or six spinnerets Fam. Dipluridae
 1. Four spinnerets Sub-Fam. Macrothelinae
 Porrhothele antipodiana (Walckenaer)
 Porrhothele simoni Hogg
 2. Six spinnerets Sub-Fam. Hexathelinae
 Hexathele hochstetteri Ausserer.

Branch SEXOSTIATAE.

(Spiders with three pairs of cardiac ostia.)

- Lip immobile. Four spinnerets Fam. Migidae
 Sub-Fam. Miginae
 Migas paradoxus L. Koch
 Migas distinctus Cambridge
 Migas sandageri Goyen

Branch OCTOSTIATAE.

Family Ctenizidae.

Sub-Family Ctenizinae.

Key to New Zealand Genera.

1. Cervical groove straight or only slightly curved. Sternal sigillae moderate size and marginal. Genus *Arbanitis* L. Koch
 Cervical groove deep and strongly procurved. Posterior sternal sigillae large and removed from margin. Genus *Cantuaria* Hogg

Genus *Arbanitis* L. Koch, 1874.

- 1873 *Pholeuon* L. Koch, Arach. Austr., p. 472 (nom. prec.).
 1874 *Arbanitis* L. Koch, loc. cit., p. 491.

Type: *A. LONGIPES* L. Koch.

Anterior eyes in a very much procurved line (anterior margins of a.m.e. behind posterior margin of a.l.e.)*; eyes equal, medians perhaps a little smaller; posterior eyes much smaller than anterior. I. and II. tibia and metatarsi with thick scopula.

Key to New Zealand Species.

(After Hogg.)

- Cephalothorax of adult not exceeding about 6 mm. in length
A. huttoni Cambridge
 Cephalothorax of adult 8-14 mm. in length *A. gilliesii* (Cambridge)

Arbanitis gilliesii (Cambridge), 1877.

- 1877 *Nemesia gilliesii* Cambridge, Trans. N.Z. Inst., 10, p. 284, pl. 10.
 1892 *Arbanitis gilliesii*: Simon, Hist. Nat. Ar. I., p. 115.
 1901 *Arbanitis gilliesii*: Hogg, Proc. Zool. Soc. 1901, p. 233, fig. 24.

Cephalothorax longer than wide, dark brown, ocular area black; cervical groove slightly recurved; anterior row of eyes strongly procurved, a.l.e. twice diameter of a.m.e., posterior row of eyes recurved, p.m.e. smallest of the eyes; ocular quadrangle twice as wide as long, quadrangle of median eyes nearly twice as wide posteriorly as anteriorly; legs (4, 1, 2, 3) with moderate covering of hairs, a number of spines on ventral surface (disposition of spines not constant); three tarsal claws, superior pair irregularly pectinate, inferior claw at ventral edge of tarsus; I. and II. tarsi and metatarsi with scopula; tarsi of pedipalp with claw usually with one long pectination; chelicerae prominent, furnished with longitudinal bands of stout hairs, retromargin with few strong teeth; abdomen elongate oval, four spinnerets, superior pair very much longer than inferior pair.

Distribution: Type locality Oamaru. Appears to be confined to the South Island. I have examined only six specimens from Oamaru, Timaru, Christchurch (Hagley Park) and Kaiapoi.

Arbanitis huttoni Cambridge, 1879.

- 1879 *Arbanitis huttoni* Cambridge, Proc. Zool. Soc. 1879, p. 682, pl. 52, fig. 1.
 1891 *Arbanitis huttoni*: Goyen, Trans. N.Z. Inst., 24, p. 255.
 1901 *Arbanitis huttoni*: Hogg, Proc. Zool. Soc., 1901, p. 236, fig. 24.

Distribution: Type locality Dunedin. I have not seen this species.

The key given by Hogg (see above) for the separation of the two New Zealand species of *Arbanitis* may be used as a guide only. An adult specimen of *A. gilliesii* has been seen in which the cephalothorax is 5 mm. long. However, it appears from the descriptions of the males that the two species are distinct.

*a.m.e. = anterior median eyes; a.l.e. = anterior lateral eyes; p.m.e. = posterior median eyes; p.l.e. = posterior lateral eyes.

Genus **CANTUARIA** Hogg, 1902.

- 1901 *Maoriana* Hogg, Proc. Zool. Soc., 1901, p. 236 (nom preocc.).
 1902 *Cantuaria* Hogg, loc. cit., 1902, p. 123.

Type: *C. DENDYI* Hogg.

Differs from *Arbanitis* in that anterior eyes are only slightly procurved, the posterior margins of the a.l.e. in line with centres of a.m.e. The cervical groove is deep and procurved. The lip is broader than long. The posterior sternal sigillae are large, half way between margin and central line of sternum, and the others are away from margin. I. and II. tarsi with thick scopula.

***Cantuaria dendyi* Hogg, 1901.**

- 1901 *Maoriana dendyi* Hogg, Proc. Zool. Soc., 1901, p. 236, fig. 25.
 1902 *Cantuaria dendyi* Hogg, loc. cit., 1902, p. 123.

Cephalothorax a little longer than wide, anterior truncated; pars cephalica rising abruptly from deep and strongly procurved cervical groove; anterior eyes in a procurved line at equal distance from each other; posterior row slightly recurved; a.l.e. largest, twice diameter of a.m.e.; p.m.e. smallest; quadrangle of median eyes narrower in front than behind and a little wider than high; teeth of rastellum deep black; labium broader than long, concave anteriorly and curved posteriorly with the sternum; maxillae long, straight, with base thickened curved over anterior of lip; legs relatively short; tarsi and metatarsi I. and II. with thick scopula; few stout spines on all legs, but disposition not constant.

The females of this species construct deep burrows (average 5 in. deep) in a sloping bank. The burrow is not normally lined with silk except around the trap-door, which is elliptical, about $\frac{1}{2}$ inch in diameter. Myers (*N.Z. Journ. Sci. Tech.*, 9, p. 129, 1927) notes that some of the females showed fight, while others feigned death, and the male was quite active and very fierce. I have not seen the male of this species, and it has not yet been described.

Distribution: Type locality Christchurch. This species has been taken at Timaru, Cave, Lyttelton, Hamner Springs and Picton. Myers (loc. cit.) reports the species from Wellington, where several burrows were shown to him by Professor Kirk.

Family **Dipluridae.**Sub-Family **Macrothelinae.**Genus **PORRHOTHELE** Simon, 1892.

- 1837 *Mygale* Walckenaer, Ins. Apt., I., p. 229.
 1871 *Hexops* Ausserer, Verh. Ges. Wien., 1871, p. 155.
 1892 *Porrhothele* Simon, Hist. Nat. Ar., I., p. 185.

Type: *P. ANTIPODIANA* (Walckenaer).

Anterior row of eyes in a straight line or slightly procurved, subequal, p.m.e. smaller than a.m.e., sternum a little longer than wide; lip thickly spined.

Key to New Zealand Species.

1. Cervical groove deep and round *P. antipodiana* (Walckenaer)
 Cervical groove long and transversely straight *P. simoni* Hogg

***Porrhothele antipodiana* (Walckenaer) 1837.**

- 1837 *Mygale antipodiana* Walckenaer, Ins. Apt., 1, p. 230.
 1846 *Mygale quoyi* Lucas, in d'Orbigny, Dict. d'Hist. 8, p. 503, pl. 1.
 1849 *Cteniza hexops* White, Proc. Zool. Soc., 1849, p. 3.
 1849 *Cteniza antipodium* White, loc. cit. supra.
 1871 *Hexops whitei* Ausserer, Verh. Ges. Wien. 1871, p. 155.
 1873 *Macrothele huttoni* Cambridge, Trans. N.Z. Inst., 6, p. 200, pl. 6, figs. 14 and 19.
 1891 *Macrothele insignipes* Simon, Ann. Soc. Ent. Fr., 60, p. 308.
 1892 *Porrhothele antipodiana*: Simon, Hist. Nat. Ar., I., p. 185.
 1893 *Nemesia kirkii* Urquhart, Trans. N.Z. Inst., 26, p. 204.
 1901 *Porrhothele antipodiana*: Hogg, Proc. Zool. Soc., 1901, p. 266.

A useful description of this species is that given by Cambridge for his species *Macrothele huttoni* (loc. cit.). The cephalothorax varies in colour, but is always unusually bright, with a darker area from the eyespace to the cervical groove. The chelicerae are also of a darker and more brownish colour. The a.m.e. are not quite their diameter apart.

This species is one of the original ten described by Baron Walckenaer from the collections of the "Astrolabe." The type is preserved dry and as a result must be very much distorted. Simon (*Ann. Soc. Ent. Fr.*, p. 307, 1891) described the type, which was then 64 years old. Pocock (*Ann. Mag. Nat. Hist.*, Ser. 6, 16, p. 224, 1895) gives an interesting discussion on the synonymy of the species and on the validity of the generic name. A specimen bearing the label *Nemesia kirkii* in the handwriting of A. T. Urquhart has been examined, and this species is now placed in synonymy as shown above.

Distribution: Quite common in the South Island, but not so common in the North Island; fairly generally distributed.

***Porrhothele simoni* Hogg, 1901.**

- 1901 *Porrhothele simoni* Hogg, Proc. Zool. Soc., 1901, p. 271, fig. 38.

Cephalothorax usually a bright red-brown to dark brown; a little longer than broad, pars cephalica moderately raised, eye space more or less flat, sloping gradually to the cervical groove, which is deep and transversely straight or slightly procurved; anterior row of eyes slightly procurved, eyes of equal size, a.m.e. their diameter apart; posterior row of eyes moderately recurved, p.m.e. smallest of the eyes; ocular quadrangle much wider than long, quadrangle of medians wider posteriorly than anteriorly; chelicerae black, furrow with 1 small—5 large—1 small—4 large teeth on inner margin and a median row of small teeth; sternum with thin covering of fine hair; sigillae medium-sized and marginal; lip convex, covered with short club-shaped spines; legs stout, superior tarsal claws pectinate in a single row diagonally; pedipalp of female with claw pectinate in single row; abdomen oval, four spinnerets, superior pair long, 1st and 3rd joints equal and longer than 2nd.

P. antipodiana (Walck.) shows a wide variation in colour and structure. This is probably the explanation of its having been described under

so many different names. The present species also shows a variation in colour and to a certain extent in structure, but the character of the cervical groove and the wider separation of the a.m.e. appear to be sufficiently constant to separate the species. It would perhaps be more likely that Hogg's species is a variety of *P. antipodiana* (Walck.), but until a wider series of specimens is available this cannot be confirmed.

Distribution: Confined to South Island, and appears to be rare. Type locality is Christchurch. I have captured specimens on the Port Hills, Christchurch.

Sub-Family Hexathelinae.

Genus **HEXATHELE** Ausserer, 1871.

- 1871 *Hexathele* Ausserer, Verh. Ges. Wien., 21, p. 171.
 1873 *Hexathele*: L. Koch, Arach. Austr., p. 459.

Type: *H. HOCHSTETTERI* Ausserer.

Pars cephalica slightly elevated, cervical groove transverse. Ocular tuber transverse, convex, short distance from edge of clypeus; anterior eyes slightly procurved; p.m.e. equal or a little smaller than a.m.e.; sternum much longer than wide; lip nearly as long as wide; legs (4, 1, 2, 3) not scopulated.

Hexathele hochstetteri Ausserer, 1871.

- 1871 *Hexathele hochstetteri* Ausserer, Verh. Ges. Wien, 21, p. 172, pl. 1, figs. 4-6.
 1873 *Hexathele hochstetteri*: L. Koch, Arach. Austr., 1, p. 459, pl. 35, fig. 7.
 1886 *Hexathele petrii* Goyen, Trans. N.Z. Inst., 19, p. 207.
 1901 *Hexathele hochstetteri*: Hogg, Proc. Zool. Soc. 1901, p. 276, fig. 41.
 1908 *Hexathele huttoni* Hogg, Proc. Zool. Soc., 1908, p. 337.
 1908 *Hexathele websteri* Hogg, loc. cit. supra., fig. 73.

A description of this species suitable for the present purpose is given by Goyen for his *Hexathele petrii*. The species shows a very wide variation in colour and structure; the cephalothorax grades in colour from bright rose by a series of shades to black and even slate-blue. A similar series of varieties occur in the dorsal abdominal pattern (the normal lighter coloured chevrons may be entirely absent) and in the colouration and outline of the book-lungs on the ventral surface. The relative positions of the eyes also show some slight differences. All the specimens dissected possessed four pairs of cardiac ostia.

The four species were placed in synonymy after a careful examination of nearly 200 specimens (of which half were dissected). The synonymy has been verified by breeding the spider in captivity. It is hoped to publish full details of the morphology and life history of *Hexathele hochstetteri* Auss.; briefly the chief differences in structure given for the four species may be identified with various stages in development from about the fourth ecdysis to the adult spider. Dalmás (*Ann. Soc. Ent. Fr.*, 86, p. 317, 1917) suspected something of this nature, remarking of the four species, "They may not refer to a single species, but I very much doubt if they are all valid."

Distribution: Both Islands, quite common. The species appears to be social in habit.

Branch **OCTOSTIATAE.**Family **Migidae.**Sub-Family **Miginae.**Genus **MIGAS L. Koch, 1873.**

1873 *Migas* L. Koch, Arach. Austr., I., p. 467.

Type: *M. PARADOXUS* L. Koch.

Ocular area compact, wider than long; anterior eyes in a straight line or but slightly curved, distant width of eyes from edge of clypeus; posterior eyes smaller than anterior.

Key to New Zealand Species.

1. Unique double row of stout spines on metatarsus I. and II. 2
No such row of stout spines on metatarsus I. and II. *M. sandageri* Goyen
2. a.m.e. their diameter apart *M. distinctus* Cambridge
a.m.e. half their diameter apart *M. paradoxus* L. Koch

***Migas paradoxus* L. Koch, 1873.**

1873 *Migas paradoxus* L. Koch, Arach. Austr., I., p. 467, pl. 36, fig. 1.

Cephalothorax orange-yellow with more or less radiating lines of light-brown (colour varies); roughly oval with major axis truncated anteriorly, abdomen overlapping on posterior slope; pars cephalica slightly raised, set with upright bristles, sloping gradually to cervical groove which is half-moon shaped, deep, recurved; ocular quadrangle transverse, about $1\frac{1}{2}$ times broader than long; anterior row of eyes straight, lower margins of eyes in same line, a.m.e. largest of the eyes, separated about half their diameter, same distance from a.l.e.; posterior row of eyes recurved, p.m.e. smallest of the eyes, widely separated; clypeus high, $1\frac{1}{2}$ times diameter a.m.e.; chelicerae dark-brown, sparsely set with bristles; maxillae rounded at base, anterior with hair fringe; lip as long as broad; sternum glossy with fine hairs, elongate oval in form; legs (4. 1, 2, 3) short, stout; I. and II. tibia and metatarsi with double row of curved spines; superior tarsal claws curved, hook-shaped, with two or three teeth, inferior claw without teeth; abdomen brownish, darker band length of dorsal surface widening anteriorly and posteriorly, with dense covering of fine hairs; four spinnerets, inner pair slender, short, outer pair long.

Distribution: Type locality Auckland. Both Islands, more common in North Island.

***Migas distinctus* Cambridge, 1879.**

- 1879 *Migas distinctus* Cambridge, Proc. Zool. Soc., 1879, p. 683, pl. 52, fig. 2.
1886 *Migas distinctus*: Goyen, Trans. N.Z. Inst., 19, 210.
1911 *Migas distinctus*: Gatenby, Trans. N.Z. Inst., 44, p. 234, pl. 15.

Cambridge described the species from a female, Goyen described the male (loc. cit.), the former giving a good figure of the entire specimen and an outline showing the disposition of the eyes. Both papers are

readily available and no useful addition can be made at this stage to the descriptions given. Gatenby (loc. cit.) has given a very interesting account of the life history and habits of this spider.

Distribution: Both Islands, not uncommon, but rather difficult to find. The type locality is Dunedin, and Goyen (loc. cit.) notes that he has captured specimens at Portobello and along the coast nearly to Oamaru. My own collection shows the species to be confined to coastal areas in both islands: Timaru, Rangitata, Miramar, Napier, Tauranga, Waiheke Is., etc.

Migas sandageri Goyen, 1890.

1890 *Migas sandageri* Goyen, Trans. N.Z. Inst., 23, p. 123, pl. 20.

1917 *Migas paradoxus* L. Koch: Dalmas, Ann. Soc. Ent. Fr., 86, p. 320.

Cephalothorax light-brown, longer than wide, more or less oval, truncated anteriorly; pars cephalica slightly raised, sloping gradually to the cervical groove, which is deep, recurved; from the cervical groove radiate eight furrows of a lighter colour; a short distance in front are two yellowish spots, from each of which projects a straight, upright, stout bristle; ocular area much broader than long, anterior row of eyes straight or nearly so (anterior margin of a.m.e. a little in front of that of a.l.e.); a.m.e. separated by less than their radius and by a diameter from a.l.e.; posterior row of eyes recurved; legs, short, stout; I. and II. tibia and metatarsus armed with fine irregular spines arranged in two lateral rows; tarsal claws curved but not hook-like; abdomen elongate-oval, covered with short hairs, no abdominal pattern; four spinnerets, inferior pair short, slender; superior pair stout, twice length of inferior pair.

Distribution: Type locality Mokohinau Islands. I have one specimen from this locality, but have no doubt that more will be available when the islands are again visited.

This species was described by Goyen from a female, but from his paper it appears that he captured several specimens. The spider builds its nest "on the bark of trees (*Coprosma*, *Cordyline* and *Fagus*)." Dalmas placed the species as a synonym of *Migas paradoxus* L. Koch, but it is now re-established as a good species. It differs from other species of *Migas* in the absence of the unique double row of stout, curved spines on the fore legs, in the closely placed a.m.e., the presence of two characteristic spines on the cephalothorax and in the length of the spinnerets.

The curvature of the anterior row of eyes in the species of this genus have been variously interpreted by different authors, due probably to a tangent to the eyes being considered in some cases and a median line in other cases.

3. Sub-Order Hypochilomorphae.

The Hypochilomorphae includes only two species, one from North Carolina and Tennessee, and the other from China. No specimens of this Sub-Order have been found in New Zealand.